

CLAIMS

1. An apparatus for generating a wavelength-tunable short pulse, comprising:

- (a) an ultra-short optical pulse source;
- (b) an optical-property regulator for regulating the properties of an output from the ultra-short optical pulse source; and
- (c) an optical fiber for receiving the output from the optical-property regulator, the optical fiber generating wavelength-tunable ultrashort pulsed light by a nonlinear optical effect through the soliton effect and Raman scattering and generating a third harmonic of the wavelength-tunable ultrashort pulsed light by a third-order nonlinear optical effect.

2. The apparatus for generating a wavelength-tunable short pulse according to Claim 1, wherein the optical-property regulator is a light-intensity regulator.

3. The apparatus for generating a wavelength-tunable short pulse according to Claim 1 or Claim 2, wherein the wavelength of the pulsed light is altered by changing the intensity of light input to the optical fiber by the light-intensity regulator, thereby controlling the wavelength of

the third harmonic.

4. The apparatus for generating a wavelength-tunable short pulse according to Claim 1, Claim 2, or Claim 3, wherein the wavelength of the pulsed light is altered by changing the length of the optical fiber, thereby controlling the wavelength of the third harmonic.

5. A method for generating a wavelength-tunable short pulse, comprising the steps of:

(a) receiving an output from an ultra-short optical pulse source at an optical fiber, the output having passed through an optical-property regulator;

(b) generating wavelength-tunable ultrashort pulsed light by a nonlinear optical effect through the soliton effect and Raman scattering in the optical fiber; and

(c) generating a third harmonic of the wavelength-tunable ultrashort pulsed light by a third-order nonlinear optical effect in the optical fiber.

6. The method for generating a wavelength-tunable short pulse according to Claim 5, wherein the optical-property regulator is a light-intensity regulator.

7. The method for generating a wavelength-tunable short

pulse according to Claim 5 or Claim 6, wherein the wavelength of the pulsed light is altered by changing the intensity of light input to the optical fiber by the light-intensity regulator, thereby controlling the wavelength of the third harmonic.

8. The method for generating a wavelength-tunable short pulse according to Claim 5, Claim 6, or Claim 7, wherein the wavelength of the pulsed light is altered by changing the length of the optical fiber, thereby controlling the wavelength of the third harmonic.